

**MULTI-AGENCY RADIATION SURVEY AND SITE INVESTIGATION MANUAL
(MARSSIM)
WORKGROUP MEETING NOTES - FINAL**

MONDAY, AUGUST 4, 2003

ATTENDEES:

U.S. Environmental Protection Agency - OERR/ERT:	C. Petullo
U.S. Environmental Protection Agency - ORIA/HQ:	K Klawiter
U.S. Environmental Protection Agency - ORIA/NAREL:	V. Lloyd (by phone)
U.S. Environmental Protection Agency - Region 2:	N. Azzam
U.S. Nuclear Regulatory Commission - RES:	R. Meck
U.S. Nuclear Regulatory Commission -RES:	G. Powers
U.S. Navy - NAVSEADET RASO:	S. Doremus
U.S. Department of Energy (EM-33):	A. Williams
U.S. Department of Homeland Security (formerly DOE/EML):	C. Gogolak

MEMBERS OF THE PUBLIC:

Cabrera Services, Inc.: S. Hay (U.S. Air Force Contractor)
SC&A, Inc.: B. Zakheim (NRC Contractor)

DISCUSSION:

Introductions, Discussion of Meeting Agenda, and Objectives

C. Petullo introduced and welcomed the attendees. She explained that the main item on the agenda was a review and discussion of MARSAME Chapters 2 through 4. Chapter 2 was ready for review and Chapter 3 would be ready for the last day of the meeting, except for a discussion of survey unit size. R. Coleman was working on Chapter 4, but was going to need guidance from the Workgroup (WG) on how to develop the chapter. A discussion of the MDC Appendix was to be held on Tuesday. C. Petullo stated that the objectives of the four-day meeting were to finalize Chapter 2, provide guidance for Chapter 4, including a deadline for completion, and initiate comments on Chapter 3. The overall objective was for those three chapters to be essentially complete for the SAB meeting in September.

A. Williams commented on the statistical methods in MARSAME for surveying property. Although MARSAME has substantial value, he felt that DOE management would not agree to anything less than 100 percent scan of property being surveyed. It was pointed out that MARSAME is a guidance document, which can be used by individual agencies at their own discretion. It was pointed out that percentage scan-to-release was on the agenda for discussion later in the day.

Agency Status and Updates Relevant to MARSSIM

S. Hay reported that the Air Force is working on studies of alternative types of data collection for buried material, particularly historical data. A. Williams expressed an interest in looking at this data. K. Klawiter mentioned that she had investigated funding for a contractor review of MARSSIM, but the project was not selected.

R. Meck had a number of comments and updates:

1. Appendix B of MARSSIM needs to be updated based on comments from the Annual Health Physics (HP) Society meeting.
2. Stuart Walker from the CERCLA office gave a presentation at the HP meeting saying the office has not signed off on MARSSIM. The WG wanted clarification if this was the case. C. Petullo and K. Klawiter agreed to clarify this issue.
3. A link needs to be established on the MARSSIM website to John Arnesen's (ANL) paper on RESRAD for MARSSIM. This paper addresses area factors. It was suggested that the WG review this paper.
4. Applications for MARSSIM-related instrumentation updates need to be established. MARSSIM should reflect the advent of new instrumentation.
5. A request has been made that MARSAS look at subsurface contamination and source contamination in the saturated layer. There might be variable DCGLs associated with depth and the WG thought that this issue should be discussed in MARSAS.
6. MARSAME implementation issues of concern included insufficient characterization and survey design.
7. R. Meck stated that his management had encouraged him to submit a MARSSIM abstract to an international meeting in Madrid, Spain. C. Petullo and K. Klawiter will provide the slides for the HP presentations.

MARSSIM Administration and Maintenance

Review of Action Items from the May 5-8, 2003 Meeting (Attachment 1 to the Agenda)

1. D. Alberth did not contact C. Petullo about names of potential experts on human factors or potential funding
2. N. Azzam was not present to report on his progress with the table in Chapter 2.
3. D. Caputo had prepared the MARSAS overview for the HP meeting.
4. R. Coleman was unable to complete his work on Chapter 4, since the May 29th conference call was cancelled.
5. C. Petullo presented the MARSAS overview at the HP Meeting
6. C. Gogolak provided a written response on applying statistical terms to errors and uncertainties and a copy of the NIST pamphlet.
7. S. Hay and R. Coleman were unable to interface on their chapters. Resources were not available to revise Chapter 1.
8. G. Jablonowski did not provide the information on radon to S. Hay.
9. K. Klawiter tabled the first item, visit from the EPA/Customs Scrap Metal Surveillance Program, until the next meeting. The SAB-RAC meeting is scheduled for 9/30. The minutes

of the last SAB meeting are not yet available. C. Petullo requested an unofficial copy of the minutes to prepare for the September meeting. K. Klawiter agreed to try to obtain such a copy. Funding for a contractor review of MARSSIM was submitted but not selected. The list of contaminants from wastewater treatment facilities was just sent to S. Hay and appears to be what is needed. In a written response, K. Klawiter provided the names of potential experts on human factors. She also arranged for the conference room being used for the meeting. A written response was provided on definitions of surface versus volume contamination. The HP Meeting presentation on MARSAME was completed and presented.

10. Vicki Lloyd did not provide a determination on EPA's position on documenting data indirectly during normal operations, by using a QA process. There was nothing new to report on the review of Chapter 9 of MARSSIM or on the collection of information on Daubert factors. In terms of the EPA TRIAD documents, K. Klawiter will send the WG the document, "The Use of Real Time Instrumentation to Achieve Site Closure."
11. C. Petullo provided the WG copies of the Princeton Plasma Physics Lab article. The Daubert factors paper still needs to be sent to members of the WG. The February WG meeting notes were finalized. R. Meck researched the Federal rules of evidence and provided the WG with the URL for NUREG 1640. C. Petullo presented the MARSAS overview at the HPS meeting.
12. A. Williams provided written responses on the isotopes for the table in Chapter 2 and the potential experts on instrumentation. G. Powers mentioned a potential expert at LLNL and agreed to contact him.
13. Action items for all WG members on (1) checking with legal counsel about legal methods for classifying evidence and (2) checking with waste brokers on how waste manifests are filled out on items with inaccessible areas.

Approval of May 2003 Rev. 1 Meeting Notes

The following corrections were made. The May minutes will be finalized after these edits.

1. Steve Masciulli's name was misspelled in the list of attendees and needs to be added to the last three days of the meeting.
2. D. Valdes' name is misspelled on the list of attendees for the last day of the meeting.
3. J. Laforanara's name is misspelled on the list of attendees for the last day of the meeting.
4. Page 2: End of paragraph beginning A. Williams should read, "DOE uses requirements similar to the Decommissioning Rule for the release of real property."
5. Page 2: First line of paragraph should read, "G. Powers reported that the MARSAS technical subcommittee will meet"
6. Page 5: Middle of page discussion of EPA SAB should read "Radiation Advisory Committee (SAB-RAC)"
7. Page 5: End of middle paragraph should read, "... will drive the DCGL and in that way should be considered in the process."
8. Page 6: close up erroneous line spacing.
9. Page 10: close up erroneous line spacing.
10. Page 12: Second paragraph, four lines from end, delete "need to".

Report of MARSSIM Session at Annual HPS Meeting

C. Petullo reported that the session had gone very well, was well attended, and that attendees were very complimentary and appreciative of the presentation content and for presenters being forthcoming. It was agreed that all MARSSIM session presentations, except for contractor presentations, would be posted on the MARSSIM website. C. Petullo agreed to send the presentations from this meeting to George Powers for his presentation to the NEI meeting.

Training Update

The following MARSSIM training courses were mentioned:

NRC: August 8, 2003 at NRC

DOE: August 26-28, 2003 in Las Vegas

Rutgers: January 13-15, 2004 in New Jersey (funding still not identified).

Department of Homeland Security WG Membership

C. Gogolak had approached C. Petullo about the new department becoming a full member of the WG. C. Petullo asked the WG for feedback by the end of the meeting as concurrence was necessary. There was a discussion of admitting the agency for membership. The main concern was the size and complexity of the agency causing delays in MARSSIM product approval.

Contact List Corrections

The list was sent around to attendees for updates and corrections.

General Discussion of Administration Issues

C. Petullo expressed concern about the lack of response by many WG members to the action items. It was suggested that each agency POC remind their own agency personnel about responding to action items. It was agreed that receiving the meeting notes sooner would help resolve this problem. C. Petullo asked that the contractor deliver the meeting notes seven days after the close of the meeting.

MARSSIM Website

There was a discussion about responses to comments that are posted on the website. It was agreed that commentors need to know that it may take as long as 10-12 months to get a resolution for a response. The process for addressing comments is as follows: the comments posted on the website are noted by C. Petullo, who brings them to the next WG meetings for resolution. The WG agreed that a note of receipt should be sent to the commentor upon receipt of the comments, indicating a possible timeframe by which responses should be expected. These responses will likely be posted directly on the website or addressed as a FAQ on the website.

There was further discussion about other websites such as the HP website, PowerNet and RADSAFE, where MARSSIM questions are posed and not always answered accurately. It was agreed that it is not possible to police all the websites. C. Petullo suggested that maybe a contractor could perform a regular search of these websites and see if this is a significant problem. It was suggested that maybe a one month assessment be done or a review of historical comments and questions on these websites. C. Petullo agreed to investigate the possibility of funding a contractor to do this research.

It was suggested that the website have a link to fundamental issues, such as K-schemes, nuclides of interest, and other tools.

Public Comment

No members of the public addressed the WG.

Preparation for SAB-RAC Briefing

C. Petullo asked the WG for input on what should be presented to the SAB-RAC at the end of September. One objective of this meeting is to update the SAB-RAC on progress since the last briefing. The following items were listed for inclusion at the meeting:

- February status
- Outline of big picture and RAC comments
- Roadmap of MARSAME process
- Actions taken
- MARSAS update
- Status of technical issues associated with MARSAS.

S. Hay provided his notes from the last SAB-RAC meeting for the WG. C. Petullo read out selected areas of these notes. Issues that were of interest to the SAB-RAC included: controls on reuse scenarios, new and innovative techniques in MARSAME, accessibility, restricted release scenarios, samples and consequences of incorrect sampling and reference documents from NRC and DOT. It was felt that the inclusion of transportation regulations would be very valuable, particularly due to the international scope of these regulations.

C. Petullo advised the WG to look for a draft of the SAB-RAC presentation around September 1st.

Sentinel Measurements

The WG embarked on a discussion about inaccessible areas and the use of sentinel measurements. The need for sentinel measurements in the context of DQOs and HSAs was discussed. The question of the use of sentinel measurements to determine whether materials are impacted or not was debated. Some WG members were concerned because sentinel measurements are not really quantitative. Before the discussion was tabled for later in the

meeting, **it was concluded that there are no real inaccessible areas, only those that cannot be easily measured.** If materials are impacted, measurements have to be made. The issue comes down to the cost/benefit of such measurements. The WG recognized that the major cost of a survey could be making inaccessible areas accessible for measurement.

Discussion on Scanning

K. Klawiter explained that the scanning issue centers around the fact that, in MARSSIM, scanning is an auxiliary measurement. The question of whether you can perform less than a 100 percent scan if the MDC is below the DCGL is not discussed in MARSSIM. It must therefore be discussed before it is deemed acceptable for MARSAME. C. Gogolak stated that scanning issues relate to coverage and documentation.

The question was raised about whether scanning alone is sufficient. If 100 percent is scanned, does this eliminate the need for sampling and its associated costs? If no less than 100 percent scanning is agreed upon, then there would be no difference between the classes of survey units. This would add a great burden to the classification process.

C. Gogolak agreed to draft some additional MARSSIM guidance on the percentage scan-to-release issue for WG members to present to their individual management, as well as the issue of MDC as related to MQC. These two FAQs would be prepared by September 30, 2003.

Acceptance Criteria

C. Gogolak explained that he had been struggling with the issue of acceptance criteria. There is extensive literature on the subject of acceptance criteria which, although it may be applicable to MARSSIM, does not apply to MARSAME. New concepts in the literature include using two-stage sampling as a way of decreasing sample size. Additionally, there is a concept of changing the rigor of sampling, that is modifying the strength of the survey based on what is coming through the facility.

R. Meck stated that the NRC likely will continue with dose or risk criteria rather than acceptance criteria.

TUESDAY, AUGUST 5, 2003

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U.S. Environmental Protection Agency - OERR/ERT:	C. Petullo
U.S. Environmental Protection Agency - ORIA/HQ:	K Klawiter
U.S. Environmental Protection Agency - ORIA/NAREL:	V. Lloyd (by phone)
U.S. Environmental Protection Agency - Region 2:	N. Azzam
U.S. Nuclear Regulatory Commission - RES:	R. Meck
U.S. Nuclear Regulatory Commission - NMSS:	J. DeCicco
U.S. Nuclear Regulatory Commission - DWM:	A. Huffert
U.S. Navy - NAVSEADDET RASO:	S. Doremus
U.S. Department of Energy (EM-33):	A. Williams
U.S. Department of Homeland Security (formerly DOE/EML):	C. Gogolak

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DISCUSSION:

MDC Appendix Development

Clarification was needed on who from the WG was going to write the MDC Appendix and what was to be in it, as the last meeting notes did not answer those questions. A. Williams noted that Jim Berger had written an MDC report related to survey methods several years ago.

C. Gogolak agreed to write the appendix and use the MDC/MQC FAQ discussed in yesterday's meeting as a starting point. He mentioned an ISO method for dealing with measurement uncertainty. The procedure is similar to developing confidence intervals. Systematic and random error are not used by the ISO. Type A uncertainty evaluations are based on repeated measurements. Type B evaluations are based on assumptions from the distribution. C. Gogolak referred the WG to the "Guide to Estimating Measurement Uncertainty (GUM)" (ISO-GUM) document that was published in 1994.

Since uncertainty is so important to the decision-making process, it is important that it is not underestimated. These new concepts of being able to estimate uncertainty are found in the ISO-GUM document. This guidance has been adopted by MARLAP. Previous work done in MARSSIM is consistent with this guidance.

The WG discussed uncertainty issues. A major problem is when uncertainty is close to a decision point for release. Another issue concerns a subsample. This subject is very complicated and is discussed in a book written by Pitard on the methodology of Pierre Gy. C. Gogolak alerted the WG to Appendix F in MARLAP that simplifies this book and suggested that this be read.

The WG discussed the issue of sampling small articles. Both process knowledge and DQOs can help with this problem. In addition, MARSSIM guidance suggests scanning as opposed to sampling is the way to handle small, elevated areas of contamination.

The EPA representatives were asked if other parts of the agency address issues of uncertainty in such detail. K. Klawiter felt there was probably no evidence to suggest that they did. C. Petullo pointed out that the WG is in the forefront and should ensure that better measurements are made as a result of this guidance.

In terms of developing the appendix, it was suggested that a list of major sources of error be provided to C. Gogolak by the WG members. C. Gogolak said that it was particularly important to receive input from people who perform a lot of measurements. It was agreed that the WG field personnel would send C. Gogolak information on major sources of error by September 1st. N. Azzam clarified this task by suggesting that the list should address only MARSAME issues, not those associated with MARSSIM or MARSAS. C. Gogolak asked that it include uncertainties of measurements made with scanning instruments. R. Coleman referred WG members to an HP meeting paper from about ten years ago that deals with the problem of measurement uncertainties.

The WG discussed R. Meck's idea of designing an experiment to obtain data related to measurement uncertainty, which is an approach used in Germany. S. Doremus thought that the DOE Grand Junction office may have samples that could be used in such an experiment. R. Meck asked if this was a significant enough problem to justify funding such an experiment. It was suggested that an experiment would only serve as a learning tool or as a calibration source. Furthermore, there was a great concern that such an experiment would delay getting out the MARSAME product by January 2004. Similarly, funding such an experiment may not be possible. S. Doremus and R. Meck agreed to investigate funding for such an experiment.

The question was posed as to why there is so much difficulty in designing surveys for material release, when waste manifests are prepared so easily. It was thought that uncertainty is probably overestimated in preparing waste manifests. Furthermore, it was pointed out that in preparing waste manifests, what is measured for cleanup includes non-contaminated material. This is due to the limitations of the cleanup equipment and the cost of keeping staff on site.

C. Petullo listed items for the content of the MDC Appendix on a flip chart. These included:

1. Introduction: ISO, NIST, Type A and B, error propagation, uncertainty, relationship between uncertainty and MDC.
2. MDC and MQC calculation and uncertainty analysis.
3. Some considerations specific to field instrumentation, with some level of generality. Focus on field issues such as scan, survey, outdoor instrumentation, 4π counts, ISOCS, gamma spec, GADRAS, gamma sensitivity, MCNP, gamma shield, conveyerized scans, e.g., efficiency, move the monitor, and source geometric modeling of conversion factor
4. Planning versus retrospective analyses.
5. Recordkeeping/QC.

6. Physical conditions present at the site that would affect MDC and MQC.
7. Reporting uncertainty.
8. Estimating the uncertainty of a method a priori vs. the uncertainty of a specific measurement a posteriori.
9. Ambient gamma interference (N. Azzam prepared an SOP on this subject).

It was agreed that the discussion of MDC and uncertainty partly applied to the DQO and partly to the DQA. The entire appendix will apply to both MARSSIM and MARSAME. R. Coleman raised the question of how uncertainty will be reported. C. Gogolak suggested a graded approach to uncertainty reporting. N. Azzam raised the question of uncertainty reporting in a restricted versus a free-release scenario.

Administrative Matters

R. Meck provided the WG with an article on Daubert factors and rules of evidence. These documents are important for historical assessment work. R. Meck also provided information on international transportation limitations and a copy of the announcement for the International Radiation Protection Association in Madrid. R. Meck asked C. Gogolak for a copy of his presentation to the HP meeting.

C. Petullo reiterated that the field personnel on the WG provide information on uncertainty issues, including scenarios and equations, to C. Gogolak by September 1st. She also asked that the rest of the WG receive copies.

R. Meck asked that the updated Appendix L be placed on the website. It was also decided that, if funding is available, the WG would ask SC&A to update the MARSSIM contact pages annually and place on the website. C. Petullo will work with R. Meck on getting funding for this activity.

C. Gogolak agreed to prepare a preliminary draft of the MDC appendix in time for the SAB-RAC meeting at the end of September.

C. Petullo will e-mail the Daubert factors paper to the WG.

C. Petullo raised the issue of the Department of Homeland Security joining the WG following the previous day's discussion. She provided a draft letter to be sent to EML to the WG for their review. The WG provided edits to the letter and it was suggested that C. Gogolak's name be specifically mentioned as representative.

Review of Chapter Two of MARSAME

General Comments

- What is the level of readership for which the document is designed?
- The terms "contamination" and "sentinel measurement" need to be in the glossary.
- Check on the new transportation regulations.
- Need to have consistent definitions in MARSSIM, MARSAME, and MARSAS

- Need to review literature for definitions
- C. Petullo wants to revisit the entire subject of the definition of surface contamination before the end of the meeting.
- K. Klawiter will research the term “acceptable knowledge”
- Somewhere in Section 2.3, distinguish between the illicit trafficking of radioactive materials and the movement of items in general commerce, such as fertilizers, phosphates, ores and sands.
- Consider replacing entire Section 2.4 with text from the May meeting notes, Pages 12-13 and moving Section 2.4 to an appendix.
- K. Klawiter will obtain a copy of the EPA Report to Congress TENORM relevant to Table 2-1 for S. Hay.
- In reference to Section 2.7.5, should a conceptual model be developed at this stage?

Page 2-1

- Line 4: Replace “later” with “typically”
- Line 4: Replace “and” with “that”
- Line 11: delete “acceptable knowledge”
- Line 17: Write the sentence in the plural, e.g. differences
- Line 18: delete “classification”
- Line 21 and 22: Definition of surface contamination needs to be revised. (A. Huffert mentioned an NRC Office of State Programs document that may help.)
- Line 26: Replace “readily be wiped by hand” with “be measured”
- Line 26: Replace “standard” with “conventional”
- Line 28: Replace “described in” with “consists of”
- Line 31: Add HA to the title, i.e. HA DQOs.

Page 2-2

- Line 35: Replace “HSA” with “HA”
- Line 45-48: Replace references with EPA and NRC references provided by R. Meck.

Page 2-3

- Line 81: Add ceramic and granite materials to Table 2-1
- Line 81: Add coal ash and metal slag to materials listed in Table 2-1
- Line 96: Decision needs to be finalized on which type of units will be used in text, international superscript units or conventional units.

Page 2-4

- Line 101: Need to revise term “solid element”
- Line 130: Replace opening phrase with “Prior to the Nuclear Test Ban Treaty of 1963”

Page 2-5

- Line 160: Add “at a licensed facility” after the words “outdoor material staging area”
- Line 161: Replace “rusty” with “surplus”
- Line 162: Add a comma after the word “case”

Page 2-6

- Line 170-179: Delete entire paragraph, as cost is not relevant. Maybe move to 2.7.4
- Line 182: Replace “affected by radionuclides” with “potentially contaminated”

Pages 2-7 to 2-18

R. Meck provided the following comments before leaving the meeting. (The WG did not actually get to these sections of Chapter Two during Tuesday afternoon.)

- Lines 212-213: could not understand
- Line 352: Add “except for sintered and cast products” after “Metals are usually non-porous.”
- Line 412: Replace “wiped by hand” with “measured”
- Line 473: Add “authorized release conforms with DOE 5400.5.”

Discussion of Section 2.6: Sentinel Measurements

The WG embarked on a detailed discussion of sentinel measurements. Important points made during this discussion included:

- Is it the assumption that materials are impacted if sentinel measurements are performed?
- How much confidence is there in sentinel measurements?
- The MARSAME guidance is not only for licensed facilities, but applies to other types of surveys.
- How do sentinel measurements differ from Class III surveys?
- Scanning issues are not considered in this section. The question is not whether materials can be released from control, but should they be placed under control.
- Should the scope of MARSAME be limited to materials going out of a facility, as opposed to materials entering the country or a facility? There is an increasing amount of screening that is and will be carried out by DOE and other agencies, for which MARSAME is applicable. It is unlikely that the guidance will be used in a first detection situation involving cargo entering the country.
- Sentinel measurements are troubling for the WG, as they are inconsistent with the MARSSIM guidance on how to do a Class III survey. Do they have the same qualities as measurements performed under MARSSIM guidance for HSAs?
- Which is the right approach – “Don’t perform sentinel measurements unless you think something is impacted,” or “It is impacted, so perform a sentinel measurement” ?
- Should the procedure for performing a measurement be the same whether the objective is to release material from a facility, or the objective is to detect malicious or inadvertent shipment of materials?

Meeting Date: August 4-7, 2003

Date Prepared: August 14, 2003

- A review of the scope of the MARSAME guidance was provided to the WG: “Measurement of Materials, Equipment and Personal Property.”
- Not every MARSAME survey has to be the same as a MARSSIM survey. If a sentinel measurement produces a negative result, then maybe that is the equivalent of a Class III final status survey.

WEDNESDAY, AUGUST 6, 2003

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U.S. Environmental Protection Agency - OERR/ERT:	C. Petullo
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U.S. Environmental Protection Agency - Region 2:	N. Azzam
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U.S. Nuclear Regulatory Commission - NMSS:	J. DeCicco
U.S. Nuclear Regulatory Commission - DWM:	A. Huffert
U.S. Navy - NAVSEADET RASO:	S. Doremus
U.S. Department of Energy (EM-33):	A Williams
U.S. Department of Homeland Security (formerly DOE/EML):	C. Gogolak

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SC&A, Inc.: W. Ulicny (NRC Contractor)
EPA: Ryan Feinberg (EPA Intern)

DISCUSSION

C. Petullo reminded the WG members that some WG members' email lists are not complete. WG members should include all Federal employee WG members, contractors, and other ancillary people in emails to the WG.

Continuation of Review of Chapter Two of MARSAME

Section 2.6 (continued from yesterday)

Sentinel Measurements – Can it be used as a Class 3 Final Status Survey?

What can a sentinel measurement be used for in an historical assessment? Positive results can be used for decision-making, negative results cannot.

Pg 2.7 - No comments

Pg 2.8 - Definition from this section needs to be in the glossary. "Release" is not necessarily "Final Status".

Pg 2.9

Table 2.2.1 – Radionuclides were added to various rows. Don't use NORM, TENORM; use specific radionuclides or "uranium series" or "thorium series" instead.

Pg 2.10

A. Williams will provide a list of inserts for radionuclides in this table. The NCRP scrap metal report has a list of orphan sources melted in steel mills.

Pg 2.11

Text revisions were identified on this page. A discussion centered on the Section title. The text must explain how this information will help in an historical assessment.

Pg 2.12

Text revisions were identified on this page. A definition of “surface contamination” vs “volumetric contamination” will be needed somewhere in the document.

Pg 2.13

The document must be consistent in its use of the terms: “smear” or “swipe.” The WG concluded that “smear” should be used to be consistent with MARSSIM.

Pg 2.14

Text revisions were identified on this page. Perform a global search to make sure the appropriate term is used – “radiation” vs “radioactive materials” vs “radioactive contamination”.

Pg 2.15

Text revisions were identified on this page. A discussion concluded that the definition for “volumetric contamination” should be the model for text on this page.

Pg 2.16

Text revisions were identified on this page. R. Meck will provide S. Hay with summary of transportation regulations/ requirements/definitions. A discussion of DQO process and conceptual model resulted in the WG concluding that the DQO process should either be discussed in this section or the user should be referred back to MARSSIM.

Pg 2.17

Text revisions were identified on this page.

Pg 2.18 - No changes.

End of Chapter 2 revisions. S. Hay will revise text based on WG comments.

Next WG Meeting

The WG decided that the next WG meeting will be the week of September 22-26.

Chapter 4 Key Issues

R. Coleman distributed a one-page document entitled, “Survey Planning and Design Key Issues.” The WG discussed these issues that R. Coleman needed to resolve before he could progress further in developing Chapter 4.

N. Azzam stated that for Class 2 and Class 3 survey units, if scanning does not exceed the DCGL, statistical analyses are not necessary.

R. Meck said that modeling assumes homogeneity with the knowledge that it is likely not the case. NUREG 1640 evaluates several specific modeling scenarios – analogous to this case. Look at specific exposure/heterogeneity scenarios. To simplify, look at critical groups on a nuclide-by-nuclide basis. R. Meck described why several scenarios were evaluated.

A question was raised regarding the process for deriving DCGLs. R. Meck said to look at the radionuclide, material, and configuration and look up the combination in NUREG 1640 to find a close match. MARSAME will have to simplify the process. The simple case is to look at the radionuclide only and select the most conservative scenario. Survey design can be derived from the basis for the scenario in NUREG 1640.

C. Gogolak stated that one should be able to prepare an a priori table from NUREG 1640 basis information, and he asked if there was an equivalent to elevated measurement concentration in NUREG 1640. R. Meck said that can be derived, but it is more complicated. Mixtures of radionuclides may have different areas for averaging. And, different individuals may be exposed maximally by different nuclides in the same mixture. The problem is complicated but tractable.

A. Huffert said it would be nice as a regulator to have a table of screening values as a tool for case-specific analyses. C. Petullo asked if EPA PRGs could be used if they were modified. R. Meck said NUREG 1640 can be used on a case specific basis.

C. Gogolak asked if tools were available for using NUREG 1640. R. Meck replied that while tools are not available to the public, assumptions, parameters, technical bases, and text are available.

Because of variability (in size, i.e., different size tools), probabilistic modeling was used (Monte Carlo calculations) in developing NUREG 1640. The mean of the distribution was used and normalized dose conversion factors were calculated (dose per activity).

R. Meck said that the normalized dose conversion factors for recycled scenarios (NUREG 1640) compare (within a factor of three) with EPA dose factors (Technical Support Document). He asked how well the assumptions compare between EPA and NRC. The answer to that question was unavailable.

A. Williams asked about the use of NUREG 1640 in terms of regulatory usage. Based on ANSI 13.12, averaging will probably be over 1 m². The WG should be averaging over 1 m². (MARSAME guidance should follow current requirements.)

A. Huffert stated that NRC has to evaluate ANSI 13.12. The basis model for ANSI 13.12 may serve as a cap for area averaging.

C. Gogolak stated that requirement is a maximum of one square meter (it can be less). There are one hundred 100 cm² in 1 m². How do you take DOE Order 5400.5 requirements for numbers of measurements and apply MARSSIM to it? He said he would provide a presentation on this issue later in the meeting.

The WG discussed the selection of a 1 m²-averaging maximum as a practical implementation area. The WG agreed that they must understand the complicated situation before they can simplify it so that the mechanism would be technically defensible.

A. Williams described mill tailing standards. Averaging areas were chosen to be 100 m² because 100m² was the maximum square footprint of a home built on the land (radon). DOE Order 5400.5, took the 100 m² and used it for all radionuclides (with no good basis for anything other than Ra-226).

C. Gogolak stated that there are requirements that provide activity limits over an area. How do you design a MARSSIM survey to address limits that are concentrations over an average area.

R. Meck stated that the Chmelynski (SC&A staff) document on Survey Unit Size could be useful. He would like additional reviewers, so he distributed the document to the WG.

R. Coleman stated that there are two paths: 1) 1 m² release limits; or 2) batch surveys. Assumption of heterogeneity – what do you do with elevated spots (EMCs)? C. Gogolak said that the issue was dealt with in MARSSIM for real property.

R. Meck said that the WG does need to work through the modeling process, but R. Coleman needs to begin to develop Chapter 4 to meet the WG schedule. Can he use “small” and “large” as surrogates for specific survey areas when writing? R. Coleman said that fixed-point measurements should also be addressed.

C. Gogolak led a discussion on designing a MARSSIM survey for varying averaging areas. One needs four “numbers” to design the survey: DCGLw and corresponding (large) survey unit area, DCGLemc and corresponding (small) area for emc measurements.

Gogolak agreed to prepare an FAQ for “What do you do when you can’t scan or when you can’t scan to the DCGL because of scanning efficiencies?”

If you can’t scan down to DCGLEMC, what is an acceptable risk for missing a hot spot? If you can’t scan at all, what is an acceptable risk for missing a hot spot? (use ELIPGRID)

If the area factor is one, how do you distinguish Class 1 and Class 2 surveys? Classification survey. All remediated areas are Class 1.

If you can’t scan, the risk of missing the hot spot must be compared to the risk of shrinking the grid size.

For 100% scan, if no data exceeds the DCGL and survey is documented, no further analysis is necessary.

Discussion arose on MARSAME and survey unit size. For large areas, large numbers of pieces, etc: how much documentation is necessary? Does the recipient drive the documentation requirements? Where does MARSAME end and “something else” begin?

It was agreed that a graded approach to recordkeeping was needed, using a data quality objective approach. C. Gogolak agreed to develop the graded approach to recordkeeping within Chapter 6.

R. Coleman key issues document implies both surface and volumetric contamination. Does the WG want statistically based sampling for batches (needs to know to write ch 4)? Yes. What is the definition of a “batch”? Draft NUREG 1761 may have some of the answers.

R. Coleman likely won’t be able to have a draft Ch 4 by the next meeting. There was a suggestion that draft NUREG 1761 be reviewed at the next WG meeting.

R. Meck agreed to provide comments that NRC has received to date on draft NUREG 1761 to accommodate development of Ch 4.

Review of Chapter 3

Material was not available for review. S. Hay suggests discussion of development of a flowchart for the document per SAB comment. Comments from R. Meck and C. Petullo are that the process is not far enough along to be able to develop a flow chart for the entire document.

Overarching Technical Issues Requiring Resolution

15 issues exist, 6 have been resolved. K. Klawiter is keeping track of issue resolution.

Resolved

- 3 Scanning vs sampling vs direct measurements (Ch 4)
- 4 Where to define process knowledge in the document (Ch 2)
- 6, 10 MDC issues – C. Gogolak to address
- 13 Sentinel measurements and historical assessments
- 14 Documentation of scans

Unresolved

- 5 Number of measurements required for statistical tests for small items
Statistical tests are likely not used on small items (100% scan). R. Coleman to address in draft of Ch 4.
- 7 Definition of in toto measurements; limitations; scans or measurements; quantitative or qualitative. Depends on uncertainty and MDC. Limitations: depends on nuclide, geometry, detector type, only quantitative measurements can be used for release; same limitations as any quantitative measurements. R. Coleman to incorporate into Ch 4.

Action Item for WG to address peer review and inclusion in MARSAME of the supporting modeling that created the table, “CSM Detection Efficiencies for Beta/Gamma Emitters”.

- 2,8 How should survey units be classified and survey units defined? Depends on model interface; with the lack of model interface, use “large” or “small”. S. Hay to bring a strawman for survey unit definition and classification to the next meeting.
- 9 “Scanning only” vs “scanning plus sampling” issues will be addressed by R. Coleman in Ch 4.

THURSDAY, AUGUST 7, 2003

ATTENDEES:

U.S. Environmental Protection Agency - OERR/ERT:	C. Petullo
U.S. Environmental Protection Agency - ORIA/HQ:	K. Klawiter
U.S. Environmental Protection Agency - Region 2:	N. Azzam
U.S. Nuclear Regulatory Commission - RES:	R. Meck
U.S. Nuclear Regulatory Commission - RES:	G. Powers
U.S. Nuclear Regulatory Commission - NMSS:	J. DeCicco
U.S. Nuclear Regulatory Commission - NMSS:	A. Huffert
U.S. Navy - NAVSEADET RASO:	S. Doremus
U.S. Department of Energy (EM-33):	A. Williams
U.S. Department of Homeland Security (formerly DOE/EML):	C. Gogolak

MEMBERS OF THE PUBLIC:

Oak Ridge National Laboratory: R. Coleman (DOE Contractor)
Cabrera Services, Inc.: S. Hay (U.S. Air Force Contractor)
SC&A, Inc.: W. Ulicny (NRC Contractor)

DISCUSSION

SC&A to provide draft meeting minutes by August 14, 2003.

Continued discussion on Overarching Technical Issues Requiring Resolution

11 Percentage of Class 2 and 3 to be scanned in scan-only releases.

WG agreed on Monday to allow "scan-only to release, if the scan MDC is less than the DCGL and for 100% scan".

Class 1 – Flow chart developed to describe accessible/inaccessible areas.

Class 2 – Surveys to be representative of the whole; an example was given of X% of each bolt (different portions of each bolt) rather than X% of the bolts; different portions of room surfaces rather than just an X% panel within the room; bias toward spots likely to be contaminated (e.g., light fixtures, doorways, bolt threads, etc.); include several examples in the text; text from NUREG 1608 can be a starting point; judgmental or uniform, when warranted; take Historical Site Assessment into account when designing your X% scan; "judgmental component" is really a re-classification (tires are Class 1, rest of car is Class 3).

Multi-classifications on large objects may make sense.

Flow chart developed to describe accessible/inaccessible areas. Describe “representative”; use examples

Class 3 – Flow chart developed to describe accessible/inaccessible areas. For all flowcharts, include completion (pass/fail)

Class 3 will be the bulk of material to be released. Example: Filing cabinet, adjacent to controlled area, used to store rad records. Scan handles, faceplate, bottoms of drawers, bottom of cabinet, top of cabinet, bottom of outside. Surrogate measurements, historical assessment, process knowledge for inaccessible drawer.

Some discussion on cost. Cost should not be considered, but “practicality” should be taken into account.

R. Coleman states again that accessibility doesn’t matter, the important issue is measurability.

S. Doremus says discussion on “making 100% accessible” is not necessary. K. Klawiter says that the decisions in the flow chart will address those concerns; suggests calling it measurable/non-measurable.

C. Gogolak reads definitions for Class 2 and Class 3 Areas from MARSSIM.

R. Meck distributed “Effects of Instrument MDC on Final Status Survey Decisions” (Chmelynski paper) for review by WG. This document was prepared for MARSSIM, but may be applicable to survey unit size. Discussion on what question was asked of SC&A in preparing the document. Powers: The biggest question is how does the MDC affect grid size.

C. Petullo says there is a possibility for FAQ for using intermediate detection techniques as a substitute for scanning when MDC makes grid size too small.

What is the effect of varying ratios of radionuclides? What about using surrogate radionuclides for normally distributed combinations of radionuclides. If the ratio varies, pick a conservative one.

Addressing Public Comment

The WG addressed a comment received from a member of the public via letter on Nov 4, 2002. The letter addresses limitations of MARSSIM scanning calculations as perceived by the author. R. Coleman addresses why these limitations are acceptable. Human Factors data support these MARSSIM calculations. The WG will notify the author that his comment was received.

Continuation of Overarching Technical Issues Requiring Resolution

12 Are MARSSIM homogeneity assumptions appropriate for MARSAME?

Discussion about survey design and initial parameter assumptions. Need to know sigma only well enough to design the survey. Retrospective power curves are discussed in MARSSIM. Homogeneity affects how large sigma is, but the process of survey design doesn't change. In MARSSIM, scanning is qualitative and sampling is quantitative. In MARSAME, the homogeneity drives the percentage of area required to be scanned (Class 2 and 3). If an object is mostly clean, but with a small hot spot, sigma will be large. This places a tremendous burden on properly classifying survey units as Class 2 or 3. Discuss in Chapter 3 how inhomogeneity affects survey design. S. Hay will develop a formula to relate % area to scan delta/sigma for Class 2 and 3 survey units, assuming it's possible.

- 15 Can MARSAME be applied to any release criteria, including an average level of contamination? YES

e.g. A surface contaminated item in a box: the box passes, but at the "disposal site", the item is removed from the box and doesn't pass. In toto measurement process should identify if any objects within the box that exceed the DCGL, if final disposition is not disposal.

Responsibilities for Addressing Overarching Technical Issues

- 1 Ch 4 Coleman
- 2 Ch 3 Hay
- 3 Definitions Ch 1; application Ch 4
- 4 Ch 2
- 5 Carl to address first part, Placement TBD
- 6 Ch 4 Coleman (Appendix B)
- 7 Ch 3 Hay
- 8 Ch 4 Coleman
- 9 Addressed with 6 Gogolak
- 10 Delta/sigma Gogolak
- 11 YES, Ch 3 Hay
- 12 YES, Ch 2 Hay
- 13 "Placement" TBD - C. Gogolak to determine "Placement"
- 14 YES, but need DCGL_{EMC}, Ch 3 Hay

Ch 3 Draft Hay

Ch 4 Draft Coleman

Can Sept 15 deadline for Chapters 3 and 4?

Hay (Ch 3) 80% chance of completing by Sept 22
Coleman (Ch 4) Good chance; has 3 days to work on it

Other Remaining Document Pieces

Chapter 6 – Interpretation of Survey Results (Feb 2003 draft)
(Becoming chapter 5)

WG will deal with it after Ch 3 and 4 at Sept 22 meeting, along with SAB prep

Appendix A - Example of MARSAME Applied to a Final Status Survey. (Think about samples to include)

Appendix B - Additional Field Survey and Laboratory Analysis Equipment Specifically Related to Materials and Equipment. (Coleman)

Appendix C - Additional Sampling Methods: A List of Requirements Specifically Related to Materials and Equipment. (Perhaps task to Cabrera after Nov 1)

Glossary

Index

C. Petullo will compile a Table of Contents, List of Tables for SAB meeting.

C. Gogolak suggested that the WG provide SAB with WG meeting minutes. WG decided that February and May minutes could be provided to the SAB.

MARSAS

Funding has been sent to INEEL to address MARSAS research. R. Meck suggests that Homeland Security may have done some container literature search that may be applicable. Gogolak suggests that an assessment of the current state of practice for release of subsurface contaminated sites (rad and non-rad) would be useful. Klawiter/Petullo to check within EPA if such knowledge exists in-house. Ron Wilhelm within EPA will be contacted to see if that information resource is easily accessible.

C. Petullo to send the MARSAS literature search by Molly Leecaster to the WG.

Agenda Items for Sept 22-26 Meeting

Ch 3 review (8 hr)

Ch 4 review (8 hr)

Ch 5 (old Ch 6) review (4 hr)

SAB presentation refinement (6 hr)

Response to public comment on scanning speed (2 hr)

Discuss Williams white paper on volumetric contamination (4 hr)

Discuss Gogolak FAQs and SC&A papers (2 hr)

Admin/Wrap-Up (2 hr)

A. Williams to write White Paper on volumetric contamination.

Scheduling Future Meetings

Sept 22 – 26 (Mon-Fri) R. Meck to try to get NRC room

Dec 8-12 (Mon-Fri) K. Klawiter to try and get room in her new EPA office

Document Schedule

Internal Agency Draft of MARSAME by January 04 (not likely to meet this date).
Likely to be pushed to April 1, 2004 at SAB meeting.

MARSAS Likely to be pushed to April 1, 2005 at SAB meeting.

Definition of Classifications

Discussion resulted in conclusion that definitions in MARSSIM are acceptable for MARSAME.

Task SC&A to Look at Comments

A suggestion was offered to have SC&A look at and compile comments received on the MARSSIM document and through various electronic websites and bulletin boards. R. Meck says not enough time and money are available, and there are higher priorities.

RESRAD for MARSSIM – Williams will be able to fund Arnish (ANL) to present his paper on RESRAD for MARSSIM if the Work Group desires.

Meeting adjourned

ATTACHMENT 1

AUGUST 2003 MARSSIM WORKGROUP ACTION ITEMS

N. Azzam

- 1) Draft a response to the comments regarding MARSSIM scanning calculations received on November 4, 2002.

R. Coleman

- 1) Prepare draft Chapter 4 of MARSAME document for WG review by September 15, 2003.
- 2) Incorporate responses to overarching technical issues #1, 3, 7 (Appendix B), and 9 in Chapter 4 draft.

S. Doremus

- 1) Investigate funding for an experiment designed to obtain data related to measurement uncertainty based on a German approach and using DOE Grand Junction Office data (with R. Meck).

C. Gogolak

- 1) Draft additional MARSSIM guidance (FAQs) on the percentage scan-to-release issue as well as the issue of MDC as related to MQC. These two FAQs would be prepared prior to the September 30, 2003, SAB meeting.
- 2) Write the MDC appendix and use the MDC/MQC FAQ as a starting point. Prepare preliminary draft of the appendix prior to the September 30, 2003, SAB meeting.
- 3) Provide a copy of Gogolak presentation at the HP meeting to R. Meck.
- 4) Prepare an FAQ for “What do you do when you can’t scan or when you can’t scan to the DCGL because of scanning efficiencies?”
- 5) Develop the graded approach to recordkeeping within Chapter 6.

S. Hay (Air Force Contractor)

- 1) Revise Chapter 2 text based on WG comments.
- 2) Incorporate responses to overarching technical issues #2 (Chapter 3), 4 (Chapter 2), 8 (Chapter 3), 12 (Chapter 3), 13 (Chapter 2), and 15 (Chapter 3).

K. Klawiter

- 1) Clarify the issue of CERCLA office not signing off on MARSSIM (with C. Petullo).
- 2) Provide EPA slides from HP meeting to R. Meck (with C. Petullo).
- 3) Request a copy of the minutes from the last SAB meeting.
- 4) Send the WG the document, "The Use of Real Time Instrumentation to Achieve Site Closure."
- 5) Update the website to let commentors know that comments will be acknowledged and then answered and the timeframe in which this may happen.
- 6) Research the term, "acceptable knowledge".
- 7) Obtain a copy of the EPA Report to Congress on TENORM relevant to Table 2-1, and provide it to S. Hay.
- 8) Check within EPA to see if knowledge on the current state of practice for release of subsurface contaminated sites (rad and non-rad) exists (with Petullo).

R. Meck

- 1) Investigate funding for an experiment designed to obtain data related to measurement uncertainty based on a German approach and using DOE Grand Junction Office data (with S. Doremus).
- 2) Work with C. Petullo on getting funding for contractor support to update the MARSSIM contact pages annually for placement on the website.
- 3) Provide S. Hay with summary of transportation regulations/ requirements/definitions.
- 4) Provide comments that NRC has received to date on draft NUREG 1761 to accommodate development of Ch 4.

C. Petullo

- 1) Clarify the issue of CERCLA office not signing off on MARSSIM (with K. Klawiter).
- 2) Provide EPA slides from HP meeting to R. Meck (with K. Klawiter). Also provide to G. Powers for his presentation to the NEI meeting.
- 3) Provide WG with Daubert factors paper.

- 4) Investigate the possibility of funding a contractor to perform internet research on MARSSIM comments.
- 5) Work with R. Meck on getting funding for contractor support to update the MARSSIM contact pages annually for placement on the website.
- 6) Compile a Table of Contents and List of Tables from MARSAME for the SAB meeting.
- 7) Check within EPA to see if knowledge on the current state of practice for release of subsurface contaminated sites (rad and non-rad) exists (with Petullo).
- 8) Send the MARSAS literature search by Molly Lincaster to the WG.

G. Powers

- 1) Contact expert at LLNL on instrumentation.

A. Williams

- 1) Provide a list of inserts for table on Pg 2.10.
- 2) Prepare a white paper on volumetric contamination.

All Workgroup Members

- 1) Check with legal counsel about legal methods for classifying evidence.
- 2) Check with waste brokers on how long waste manifests were kept active.
- 3) WG field personnel send information on major sources of error (MARSAME related) to C. Gogolak by September 1, 2003.
- 4) Address peer review and inclusion in MARSAME of the supporting modeling that created the table, "CSM Detection Efficiencies for Beta/Gamma Emitters".

SC&A

- 1) Finalize May 2003 meeting minutes.
- 2) Prepare draft August 2003 meeting minutes by August 14, 2003.